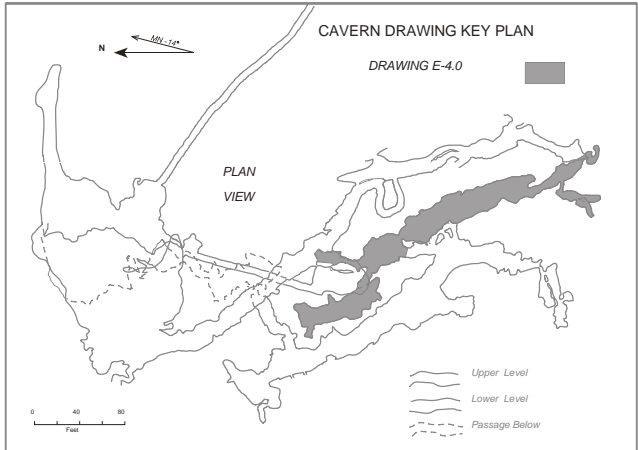


LIGHT FIXTURE(S) THIS SHEET
FIXTURE 'B' IS AN EXISTING COMPOSITE BULLET WITH VARIOUS LED PAR LAMPS
FIXTURE 'C' IS A NEW TUNABLE WHITE FIXTURE (SEE CATALOG SHEETS)
FIXTURE 'F' IS A NEW WALL MOUNTED LED FIXTURE (SEE CATALOG SHEETS)

GENERAL NOTES:

- A. AT ANY LOCATION WHERE ELECTRICAL BRANCH CIRCUIT OR SWITCH CABLES ARE TO BE LOOSE LAID (NOT COVERED WITH RUBBLE), USE FLEXIBLE CORD, HARD SERVICE, WET LOCATION TYPE SOOW.
- B. AT ANY LOCATION WHERE ELECTRICAL BRANCH CIRCUIT OR SWITCH CABLES ARE TO BE COVERED WITH RUBBLE, USE CONDUCTORS IN PLASTIC COATED FLEXIBLE CONDUIT, OR PLASTIC COATED MC CABLE, OR TEK CABLE AT CONTRACTOR'S OPTION.
- C. AT ANY LOCATION WHERE ELECTRICAL BRANCH CIRCUIT OR SWITCH CABLES ARE TO BE FASTENED TO THE CAVERN WALL, FASTENED TO A CONCRETE WALL, OR FASTENED TO THE SIDE OF OR UNDERNEATH CONCRETE STEPS, USE PLASTIC COATED MC CABLE OR TEK CABLE AT THE CONTRACTOR'S OPTION.
- D. USE JUNCTION BOX AT ANY TRANSITION BETWEEN CORD AND CABLE; CONCEAL J-BOX FROM TRAIL VIEW BEHIND NATURAL CAVERN FORMATION OR UNDER RUBBLE.
- E. POWER FEEDER CABLE TO BE TEK CABLE THROUGHOUT THIS PHASE OF PROJECT.
- F. ROUTE POWER FEEDER CABLE TO FOLLOW ROUTE OF EXISTING LEAKY FEEDER COMMUNICATIONS CABLE.



CABINET #2 THIS SHEET	
R3-CAB 2	LIGHTS
R4-CAB 2	EMERGENCY LIGHTS

THIS CROSSING CONTAINS THE FOLLOWING ITEMS:
BRANCH CIRCUITS R3 AND R4

ROUTE THE TWO BRANCH CIRCUITS, R3 AND R4 ABOVE THE TRAIL ON A LEDGE AS INDICATED ON THE PHOTO, THIS SHEET. HIDE THE CABLE USING LOOSE ROCKS AND JUDICIOUS ROUTING BEHIND FORMATIONS.

PLAN VIEW

INSTALL THE TWO BRANCH CIRCUITS LOOSE LAID ON THE TOP OF THE LEDGE AGAINST THE BACK OF THE CAVE WALL AS INDICATED. THIS LEDGE IS ACCESSIBLE.

USE ROCKS TO BREAK UP THE VISUAL APPEARANCE OF THE TWO BRANCH CIRCUIT CORDS.



PHOTO E 4.0-1
CROSSING FOR BRANCH CIRCUITS R3 & 4
ON A LEDGE ABOVE THE TRAIL

POWER FEEDER CABLE AND EXISTING LEAKY FEEDER COMMUNICATIONS CABLE, LOOSE LAID. ROUTING SHOWN IS INTENDED AS GENERAL ROUTE LOCATION IN THIS AREA. ACTUAL ROUTE LOCATION AND LENGTH OF POWER FEEDER CABLE FOLLOWING ROUTE OF EXISTING LEAKY FEEDER CABLE TO BE VERIFIED BY CONTRACTOR.

PROJECTED PROFILE

Princess Palace

Princess Dungeon

THE STAIRS SHOWN ARE THE ORIGINAL STAIRS AT THE TIME OF MAPPING

TEK CABLE UP TO SWITCH OR LIGHT FIXTURE

JUNCTION BOX AT EACH LIGHT FIXTURE AND/OR SWITCH LOCATION

ATTACH MC CABLE TO WALL AT FLOOR WITH CABLE CLAMPS. COVER WITH LOOSE STONE RUBBLE

NATURAL STONE OR CONCRETE EXISTING TUNNEL FLOOR

TUNNEL CABLE AND J-BOX DETAIL - LONGITUDINAL SECTION

NOT TO SCALE

Lewis & Clark Caverns State Park
Railing and Lighting Upgrades 2018
FWP #7176603
Montana Fish, Wildlife & Parks



Design & Construction
P.O. Box 200701, 1522 Ninth Avenue
Helena, MT 59620-0701



FUSSELL ENGINEERING
CONSULTING AND DESIGN
MISSOULA, MT 59801
2435 DIXON STREET
(406) 721-6996
fus@aol.com

drawn	check by
MKE	MTF

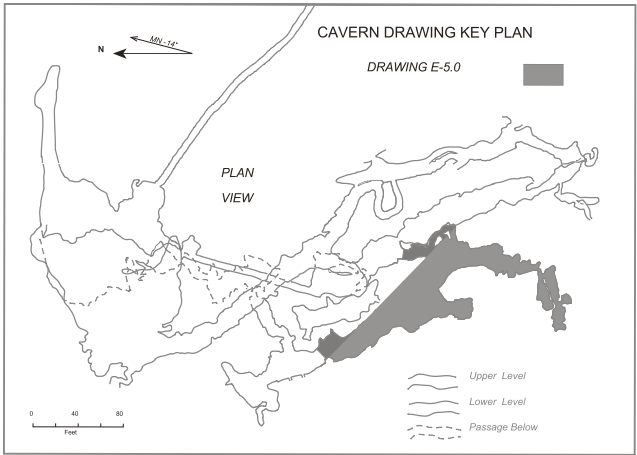
issue log	
For bidding	03/ 23/ 18

--

sheet
E 4.0
022718

LIGHT FIXTURE(S) THIS SHEET

FIXTURE 'B' IS AN EXISTING COMPOSITE BULLET WITH VARIOUS LED PAR LAMPS
FIXTURE 'C' IS A NEW TUNABLE WHITE FIXTURE (SEE CATALOG SHEETS)
FIXTURE 'F' IS A NEW WALL MOUNTED LED FIXTURE (SEE CATALOG SHEETS)



THIS CROSSING CONTAINS THE FOLLOWING ITEMS:
BRANCH CIRCUIT R7, R8

NEW ROUTING IN THIS AREA. SAW CUT EXISTING CONCRETE TRAIL AT BASE OF STAIR RISER AS INDICATED IN PHOTO E 5.1-6. FURNISH AND INSTALL SCHEDULE 40 PVC SLEEVE FOR TWO CROSSING CIRCUITS. PATCH SAWCUT TO MATCH EXISTING CONCRETE FOR COLOR/TEXTURE

CABINET #1 THIS SHEET	
R7-CAB 1	EMERGENCY LIGHTS
R8-CAB 1	LIGHTS

CONTINUATION OF EXISTING POWER FEEDER CABLE; EXISTING LEAKY FEEDER COMMUNICATIONS CABLE

R7-CAB 1 UPS
R8-CAB 1

SW12-CAB 1

CONNECTS TO SHEET E6.0

Garden Of The Gods

CABINET #1

CABINET #2

NEW MAIN POWER FEEDER CABLE W/ GROUND & EXISTING LEAKY FEEDER COMMUNICATIONS CABLE. LOOSE LAID. FOLLOW ROUTE OF EXISTING LEAKY FEEDER COMMUNICATIONS CABLE UNLESS OTHERWISE SHOWN. ACTUAL ROUTE LOCATION AND CORRESPONDING LENGTH TO BE VERIFIED BY CONTRACTOR. TYPICAL THIS SHEET.

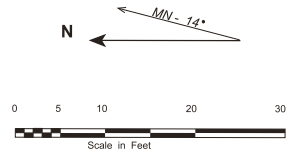
CONNECTS TO SHEET E4.0

Garden Of The Gods

THE STAIRS SHOWN ARE THE ORIGINAL STAIRS AT THE TIME OF MAPPING

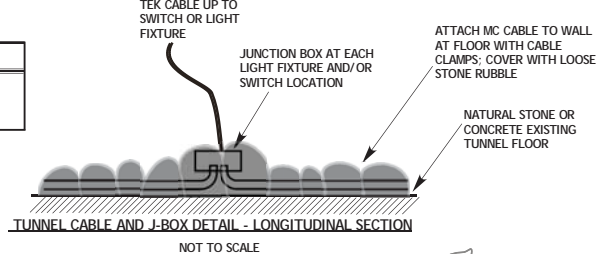
Crystal Pool

PROJECTED PROFILE



PLAN VIEW

CABINET #2 THIS SHEET	
R4-CAB 2	EMERGENCY LIGHTS
R3-CAB 2	LIGHTS



NEW ROUTING IN THIS AREA. USE EXISTING TRAIL CROSSING AT THE TOP OF STAIR 26 (SCHEDULE 40 PVC SLEEVES) FOR SWITCHING, BRANCH CIRCUITS, MAIN POWER CABLE, TO FOLLOW ROUTE OF LEAKY FEEDER CABLE.

THIS CROSSING CONTAINS THE FOLLOWING ITEMS:
NEW MAIN POWER FEEDER CABLE
EXISTING LEAKY FEEDER COMMUNICATIONS CABLE
NEW BRANCH CIRCUIT R3 AND R4
NEW SWITCH LEADS SW4-CAB2, SW12-CAB1

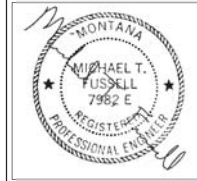
Bacon Room

Bacon

Pool

Crystal Pool

Lewis & Clark Caverns State Park
Railing and Lighting Upgrades 2018
FWP #7176603
Design & Construction
P.O. Box 200701, 1522 Ninth Avenue
Helena, MT 59620-0701



FUSSELL ENGINEERING
CONSULTING AND DESIGN
MISSOULA, MT 59801
2435 DIXON STREET
(406) 721-6996
fus@aol.com

drawn MKE	check by MTF
issue log	
For bidding	03/23/18

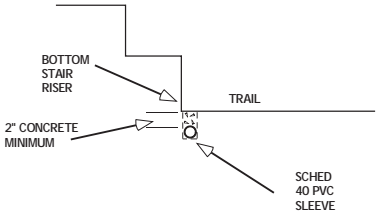
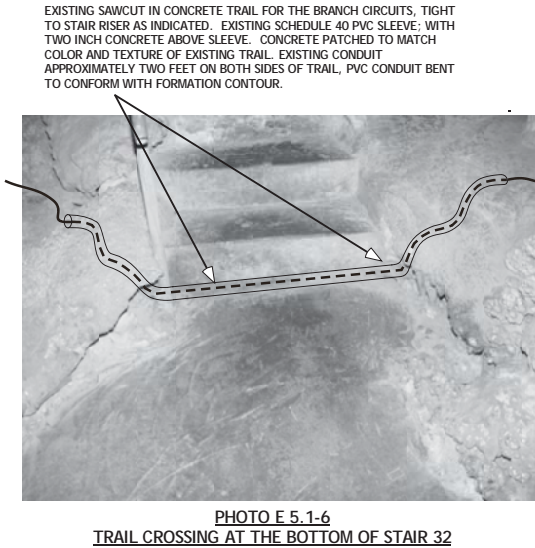
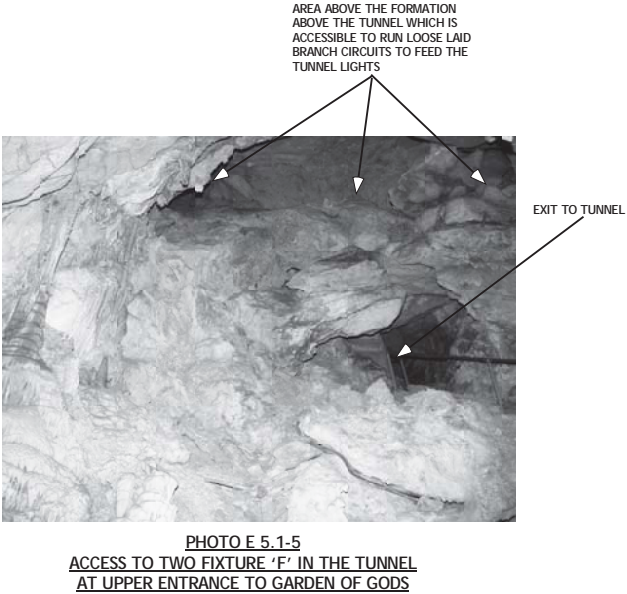
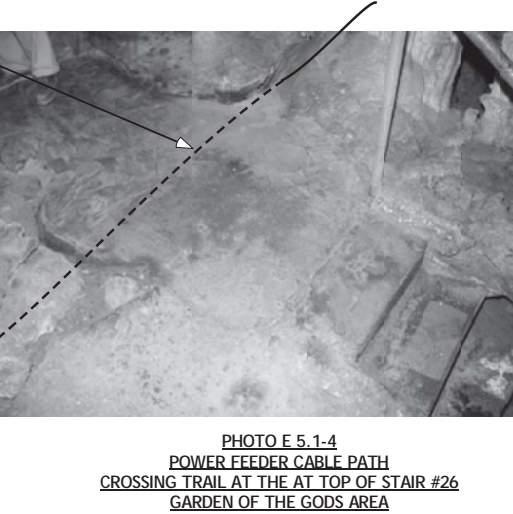
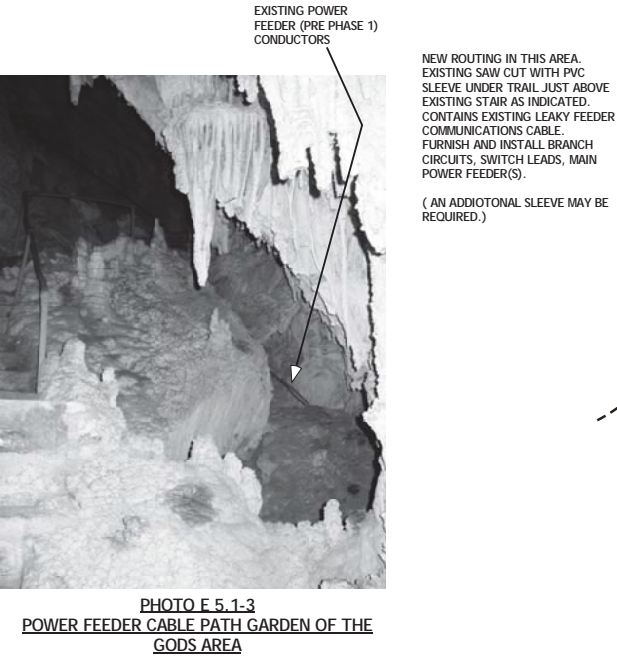
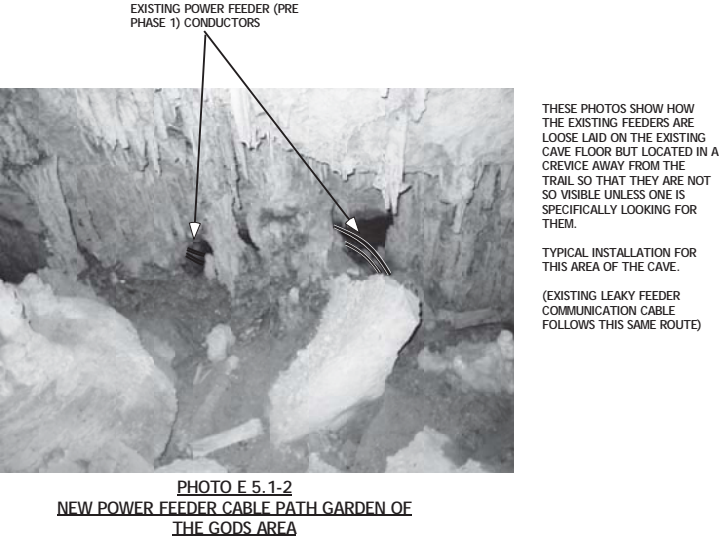
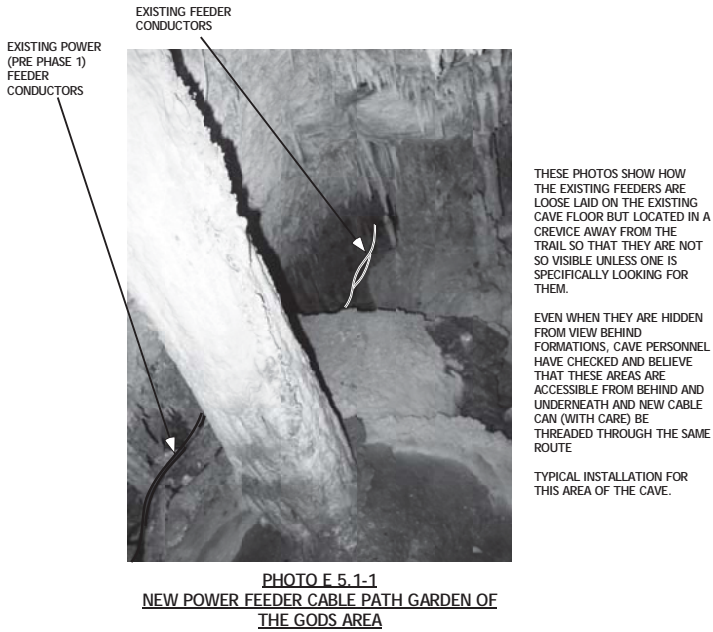
sheet
E 5.0

GENERAL NOTES:

- AT ANY LOCATION WHERE ELECTRICAL BRANCH CIRCUIT OR SWITCH CABLES ARE TO BE LOOSE LAID (NOT COVERED WITH RUBBLE), USE FLEXIBLE CORD, HARD SERVICE, WET LOCATION TYPE SOOW.
- AT ANY LOCATION WHERE ELECTRICAL BRANCH CIRCUIT OR SWITCH CABLES ARE TO BE COVERED WITH RUBBLE, USE CONDUCTORS IN PLASTIC COATED FLEXIBLE CONDUIT, OR PLASTIC COATED MC CABLE, OR TEK CABLE AT CONTRACTOR'S OPTION.
- AT ANY LOCATION WHERE ELECTRICAL BRANCH CIRCUIT OR SWITCH CABLES ARE TO BE FASTENED TO THE CAVERN WALL, FASTENED TO A CONCRETE WALL, OR FASTENED TO THE SIDE OF OR UNDERNEATH CONCRETE STEPS, USE PLASTIC COATED MC CABLE OR TEK CABLE AT THE CONTRACTOR'S OPTION.
- USE JUNCTION BOX AT ANY TRANSITION BETWEEN CORD AND CABLE; CONCEAL J-BOX FROM TRAIL VIEW BEHIND NATURAL CAVERN FORMATION OR UNDER RUBBLE.
- POWER FEEDER CABLE TO BE TEK CABLE THROUGHOUT THIS PHASE OF PROJECT.
- ROUTE POWER FEEDER CABLE TO FOLLOW ROUTE OF EXISTING LEAKY FEEDER COMMUNICATIONS CABLE.

SWITCH MOUNTING NOTES FOR THIS SHEET

- MOUNT SWITCHES SW12-CAB 1 AND SW4-CAB 2 IN INDIVIDUAL BOXES AND LOCATE IN THE SAME CAVERN WALL HOLE AS THE EXISTING SWITCHES (WHICH ARE TO BE DEMOLISHED WHEN NEW WORK IS COMPLETED).



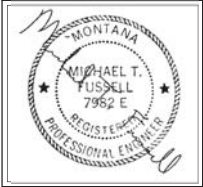
Lewis & Clark Caverns State Park

Railing and Lighting Upgrades 2018

FWP #7176603

Design & Construction
P.O. Box 200701, 1522 Ninth Avenue
Helena, MT 59620-0701

Montana Fish Wildlife & Parks



CONSULTING AND DESIGN

FUSSELL ENGINEERING

2435 DIXON STREET
MISSOULA, MT 59801
(406) 721-6996
fus@aol.com

drawn MKE	check by MTF
issue log	
For bidding	03/ 23/ 18



sheet

E 5.1